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POPULATION OF LOWLAND ANOA *(Bubalus depressicornis Smith)* IN TANJUNG AMOLENGU WILDLIFE *RESERVE* SOUTHEAST SULAWESI, INDONESIA

(*Populasi Anoa Dataran Rendah* Bubalus depressicornis *Smith di Suaka Margasatwa Tanjung Amolengu, Sulawesi Tenggara, Indonesia)*

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ABSTRAK

Pengamatan populasi anoa dataran rendah dilakukan di Suaka Margasatwa Tanjung Amolengu dari tanggal 20 Agustus 1994 sampai dengan tanggal 8 Maret 1995. Luas suaka margasatwa tersebut 500 ha. terdiri dari hutan primer, hutan sekunder, hutan peralihan (*transitional forest*), dan hutan mangrove. Delapan ekor anoa dicatat herdasarkan metode konsentrasi, 11 dan 12 ekor anoa dicatat berdasarkan metode jalur dan 10 ekor anoa dicatat berdasarkan metode jejak kaki (*footprint*). Sex ratio 1:1; perbandingan anak : setengah dewasa : dewasa adalah 2:1:5. Kepadatan populasi 1,6 ekor anoa/km^2.

INTRODUCTION

The medium sized ruminant anoas are endemic to Sulawesi, Indonesia. They are classified as endangered species by the Red Data Book of the International Union for Conservation of Nature and Natural Resources (IUCN), and on Appendix I of the Convention of International Trade of Endangered Species of Wild Flora and Fauna (CITES). In Indonesia, the animals have been protected by law since 1931.

The species have very restricted ranges and the protected areas for these animals are too small compared to its distribution; the areas are scattered into pocket systems. They are hunted illegally for their meat, hides and horns. The horns are famous as a trophy for the local people *of* the island. In addition, habitats of the anoas are now under cultivation, illegal cutting, and lumbering of the Forest Concession Rights.

The first scientific description of an anoa was given by Smith (1827) who named it *Antilope depressicornis*. Ouwens (1910) described the two living specimens from the high forested mountains of the central region of Toradja as mountain anon, ***Anon*** *quarlesi*.

The specimen first describe by Smith (1827) was in the British Museum. The horns of the specimen are ten inches long, straight, very robust, a little **depressed** (invoking the name *depressicornis* for the lowland anoa) at base, and flat on the anterior side, sub triangular to about two-thirds of their length, then tapering suddenly to a sharp point.

The head and body length is about 1,600-1,720 mm, tail length is 180-310 mm, and the shoulder height is 690-1,060 mm, body weight is 150-300 kg (Nowak, 1991). According to Groves (1969), lowland anoa has white forelegs, a long tail, the hair being sparse in adult individuals. Males are generally darker than females; often they have a white crescent at the throat. Horns are triangular in section, flattened and wrinkled, 271-373 mm length in males, 183-260 mm length in females. The skull length is 298-322 mm in males, 290-300 mm in females.

The mountain anoa has legs that are generally of the same colour as the body. The hair is dark brown to black. It has more hair than the lowland anoa does and never white crescent on throat. The tail is short, horns are rounded in section, nonwrinkled, 146-199 mm length in both sexes. Skull length of both sexes is 244-290 mm (Groves, 1969).

In the Southeast of Sulawesi, both the lowland and the mountain species inhabit some of the protected areas in the province, such as Rawa Aopa National Park, Kolaka Utara National Reserve, Tanjung Amolengu Wildlife Reserve (this study), Tanjung Batiknlo Wildlife Reserve, and Buton Utarn Wildlife Reserve.

This study was conducted to reveal the population of the lowland anoa in Tanjung Amolengu Wildlife Reserve Southeast Sulawesi, Indonesia. The data presented here are based on a field study conducted in the reserve from August 20, 1994 to March 8, 1995.

STUDY SITE

Tanjung Amolengu Wildlife Reserve is situated in the Southeast of Sulawesi, Indonesia. The forested area stretches from 123" - 123^{o}. East and 4^{o} - 5" South. This area was declared as wildlife reserve in 1974. It covers 500 ha of forested area including 75 ha of primary forest, 225 ha of secondary forest, 50 ha of transitional forest, and 150 ha of mangrove forest.

The topography is relatively flat with rugged slopes in the middlewest end in the transitional forest. Elevation reaches from 0 to 50 meter above sea level.

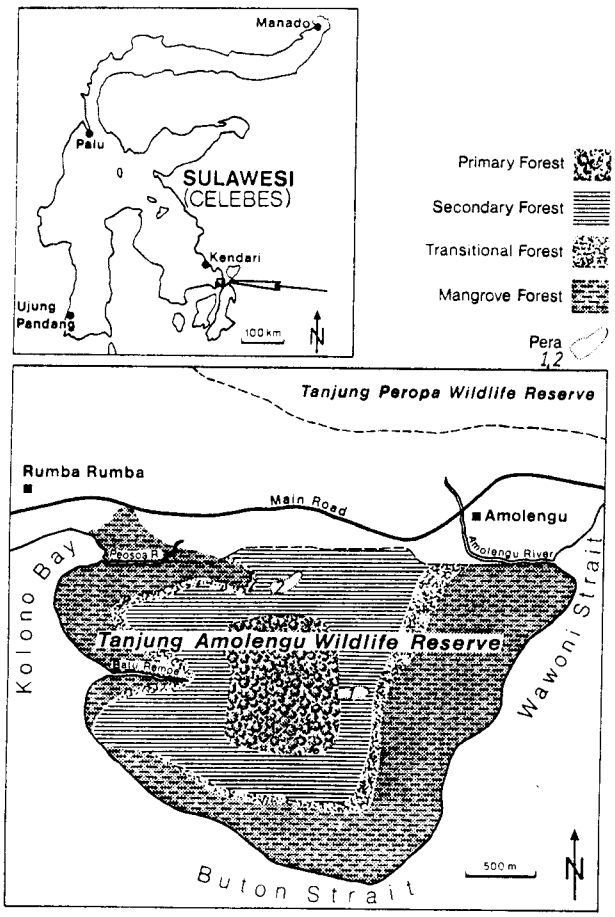

Figure 1. Study Area.

In Southeast Sulawesi, the rainy season extends from January through July with rainfall from 1,600 - 1,621 mm, and the dry season for the rest of the year. During the dry season (September 1994 - February 1995), the average daily temperature was approximately 30.8°C. The average daily relative air humidity was approximately 70.8% (at noon).

In the primary forest the dominant trees are "nguru" (*Tarrietia riedeliana*), "rao" (*Dracontomelon mangiferum*), and "kolasa" (*Parinari corymbosa*). In the secondary forest the dominant trees are "agel" (*Corypha* sp.), "bolongita" (*Tetrameles nudiflora*), "osee" (*Evodia celebica*), "ondolea" (*Canangium odoratum*), and "kalengka" (*Anthocephalus macrophyllus*). In the transitional forest the dominant trees are "dungun" (*Heritiera littoralis*), "buta-buta" (*Exoecaria agallocha*), and "agel" (*Corypha* sp.). In the mangrove forest the dominant trees are "tongke" (*Bruguiera gymnorrhiza*), "bakau" (*Rhizophora apiculata*), and "tangir"(*B. caryophylloides*).

Mammals in the reserve are lowland anoa (*Bubalus depressicornis*), rusa-deer (*Cervus timorensis*), wild boar (*Sus celebensis*), squirrel (*Callosciurus* sp.), and the tail-less black macaque (*Macaca ochreata*). Bird species, the Red-knobbed Horn-bill (*Rhyticeros cassidix*) is common in this reserve. The other birds are Pied Imperial Pigeon (*Ducula bicolor*), Green Imperial Pigeon (*Ducula aenea*), Celebes Hanging Parrot (*Loriculus stigmatus*), Parrot (*Tanygnathus* sp.), Black-naped Oriole (*Oriolus chinensis*), Celebes Scops-Owl (*Otus manadensis*), and Red Jungle Fowl (*Gallus gallus*).

METHODS

The anoa population was estimated by combination of the concentration count, line transect count, and footprint count methods. The concentration count was applied in the feeding grounds and in the wallowing sites. These observations were conducted from 06:00 to 09:00 am and from 16:00 to 18:00 pm. In the dry season observations were focussed in the wallowing sites of Baturempe. The line transect count was applied in the 12 transects, 200 m apart, with length varying from 0.4 to 2.2 km. This method was conducted twice, on January 12 and 19, 1995. The footprint count was undertaken along the trails of the animals where their footprints could be well recognized.

For the concentration count and line transect count methods, sex, number, age estimation, individual characteristics, grouping pattern, and time of encountering were recorded. For the footprint count method, lenght, width (in mm) and shape of the footprints were recorded.

RESULTS AND DISCUSSION

Tanjung Amolengu Wildlife Reserve is one of the habitats of the lowland anoa in Southeast Sulawesi. The animals had inhabited this area before the human population settled in the vicinity of the reserve. From 1940 to 1970, about two-thirds of the forest area was opened for cultivation. The only undisturbed forest during that period was in the middle part, which consider to be a primary forest throughout this study. This small pocket of forest was the main refuge for the animals during that period. This is why anoa is still found in this area, otherwise, it would have undergone local extinction.

For the concentration count method, as the study progressed it was possible to identify the animals individually through the individual characteristics such as age (juvenile, subadult, and adult), sex, horn shape, horn length, tail length, hair colour, and grouping pattern. I recorded 8 anoas based on this method. Based on the line transect count method, 11 and 12 anoas were recorded on January 12 and 19, 1995, respectively. During the field observation, I measured 70 footprints of anoa. The hoof length varies from 38-60 mm (=53.8 mm); the width is 18-30 mm (=25 mm). After classifying them, I estimated that these footprints belonged to 10 individuals of anoa. Based on the combination of these methods, the anoa population in the reserve was 8-12 individuals.

It was difficult to determine the sex of the animals based on the line transect count method due to the visual limitations when observing the animals in the dense forest. The same problem was also found in the footprint count method. The sex of the animals could not be determine based on their footprints.

Due to these difficulties, I estimated that the 8 individuals of the concentration count method were the reliable number of lowland anoa in the reserve. Composition and structure of the herd was as follows : 2 adult males, 3 adult females, 1 young adult male, and 2 infants. The sex ratio was 3 : 3 for the reproductive individuals, and 4 : 4 for the all age-classes. Ratio of juvenile : subadult : adult was 2 : 1 : 5. Population density was 1.6 individuals per km^2.

In the field study, I observed a small group consists of 3 individuals, including the adult female, a subadult male, and one infant. This group was observed two times in the feeding ground. During my first observation on August 22, 1994 at 17:00 pm, these animals were drinking and feeding. At the second sighting on September 8, 1994 at 15:00 pm, the animals were drinking. The infant was estimated to be 3 months old at that time.

One female infant was captured by a fisherman in between the transitional and mangrove forest of Peosoa on November 5, 1994 at 11:00 am. It was estimated to be 2 weeks old. I measured and tagged it, then I released it to the point where it was captured at the first time. The infant was observed again with its mother on December 1, 1994 at 10:45 am.

The anoas were observed mostly single or in pairs. I did not observe more than three individuals in a group. Of 40 observations, 21 (50.5%) were a single adult males, 3 (7.5%) were a single adult females, 9 (22.5%) were adult males with adult females, 5 (12.5%) were females with infants. Only 2 (5%) observations showed a small group consisting of adult female, subadult male, and infant.

There is no natural predator of the animals in this reserve except the reticulated python (*Python reticulatus*), but it is very rare in this area. The only native predator in Sulawesi is the Sulawesi Palm Civet (*Macrogalidia musschembroeki*), but it is absent from this reserve. During the field observation, I found only one anoa's skull, adult male, within the reserve. It was about one-half kilometer into the southern part of the feeding ground. La Ondu (pers. comm.) during his 13 years dedication as a forest ranger in the reserve failed to found one anoa's skull within the reserve. This description might give a first impression about the present population of lowland anoas in this area.

The two anoa calves which were sighted during the field study give the impression that they are moderately able to produce offspring. Morphologically, the anoas are in good condition, although it is still in question, whether this small herd can exist in the future and produce further fit generations. The small herd is faced with genetic degradation due to inbreeding between the individuals. These circumstances are negatively influenced by the increasing human population surrounding the reserve. In 1994, there were 2,700 people inhabiting three villages in the northern part of the reserve. This number will increase considerably within a short time.

Formerly, the anoas often crossed from one to the other and changed their home ranges. Anoas from Tanjung Amolengu crossed to Tanjung Peropa Wildlife Reserve, and oppositely, crossed the place of the settlement located between the two reserves. There are no corridors available for the animals movements and individuals changes between the reserves.

CONCLUSION

The lowland rainforest of Tanjung Amolengu Wildlife Reserve is one of lowland anoa habitats in Southeast Sulawesi. This refuge plays undoubtedly an important role in the protection of the anoa herd and different other wild animals. The anoa population in the reserve was 8-12 individuals. The small herd is faced genetic degradation due to inbreeding between the individuals. Corridors should be established for the anoas which provide access for the individuals change between the anoa herd form Tanjung Amolengu Wildlife Reserve to Tanjung Peropa Wildlife Reserve and vice versa.

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